**Electives List**
**Fall 2022**
**Hillier College of Architecture & Design**
**3/30/2022**

**UNDERGRADUATE ELECTIVES**
Fall 2022 elective offerings are listed below. For A+D and B.S.Arch students all of these courses count as electives. For B.Arch students, electives are listed in three categories: 1) Technology Electives, 2) History Theory Electives; and 3) Architecture (College) Electives. The Fall 2022 NJIT Course Schedule indicates all scheduling information. Search by clicking on the appropriate prefix for each course, listed in the left-hand column (eg. ARCH, ID, AD, etc.). In addition to the electives listed below, students may take independent study courses, and eligible students* may also take advantage of the graduate electives.

| Course # | Section # | Title | Instructor |
|---|---|---|---|
| **Technology Electives** | | | |
| ARCH 301 | 001 | Digital Modeling & Fabrication | TBD |
| ARCH 337 | 001 | Building Information Modeling | TBD |
| ARCH 461 | 001 | Resilient Structural Design & Construction | R. Taher |
| ARCH 541 | 001 | Material Systems in Design | T. Ogorzalek |
| ARCH 583 | 103 | ST: Media Architectures: Immersive Design Tools | A. Zarzycki |
| ARCH 583 | 007 | ST: Prefabricated Architectural Construction | J. Figueroa |
| ARCH 583 | 101 | ST: High-performance Facade Design | W. Ko |
| ARCH 583 | 105 | ST: (Wood)n't You Like to Know | Pelligrino & Firestone |
| **History / Theory Electives** | | | |
| ARCH 331 | 001 | Formal Principles of Landscape Design | T. Navin |
| ARCH 574 | 001 | Case Studies in Community and Urban Design | C. Harp |
| ARCH 583 | 003 | ST: Sustainable Systems: From the Building to the Urban Scale | E. Zipori |
| ARCH 583 | 009 | ST: Design and Social Identity | N. Mehta |
| ARCH 583 | 011 | ST: History and Theory of Urbanism in the Middle East and North Africa | M. Abdelazim |

**Architecture Electives**

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| ARCH 583 | 001 | ST: The Business of Architecture | M. Bess |
| ID 340 | 001 | Materials and Processes | M. Decker |
| INT 350 | 101 | History of Furniture | G. Von Koenig |
| DD 334 | 001 | Simulated Environments | T. Narahara |
| AD 490 | | Lighting | M. Feris |
| AD 490 | | Art After the 80s | E. Altin |
| AD 490 | | Mapping Equity | A. Penalba |

*Undergraduate students with a cumulative GPA of 3.0 or higher are encouraged to take 600-level graduate electives. Undergraduate students pay the undergraduate tuition rate for graduate courses and can apply up to 12 credits toward both their undergraduate and graduate Hillier College degree. Prior to enrolling in a graduate elective, you must apply for a Dual Degree Program, by completing the approval form & submitting it to the Registrar for approval.

**GRADUATE ELECTIVES**

| Course # | Section # | Title | Instructor |
|---|---|---|---|
| **Technology Electives** | | | |
| ARCH 622 | 001 | Life Cycle Assessment in Design | J. Cays |
| ARCH 626 | 001 | Building Dynamics | V. Parlac |

**History / Theory Electives**

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| ARCH 636 | 001 | Methods of Urban History* | G. Theodore |
| ARCH 677 | 001 | Geographic Information Systems* | E. Cody |

**Architecture Electives**

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|---|---|---|---|
| ARCH 662 | 001 | ST: Mapping Urbanism** | K. Hutzell |
| ARCH 654 | 001 | Land Remediation and Community Revitalization** | C. Santasieri |

\*   Required Master of Urban Design (MUD) course
\*\* MUD Urban Design Selective course

**UNDERGRADUATE ELECTIVES**
**Technology Electives**

**ARCH 301 Digital Modeling & Fabrication (Instructor TBD)**
The seminar explores advanced 3-dimensional computer modeling techniques and data export for assembly and fabrication to various computer numerically controlled (CNC) hardware available at the School of Architecture. Specifically, students engage in NURBS and solid modeling using Rhinoceros 3D and export data through various Rhino plug-ins including RhinoCAM. Sequential fabrication exercises culminate in a final project.

**ARCH 337: Building Information Modeling (Instructor TBD)**
This course explores both technical and philosophical approaches to the use of the computer in architectural analysis, design development, information management, and document delivery. Autodesk Building Systems and Autodesk Revit Building will be used for 3D modeling and 2D documentation employing a systems-approach framework for spatial allocation, energy analysis, and structural considerations. The workings of the foundational information databases of the respective software will be thoroughly explored. Project requirements will include building program resolution, solar analysis, asset scheduling, document layout, and design visualization. Proficiency with Autodesk Autocad (2D) and understanding of general CAD principles are required prerequisites.

**ARCH 461: Resilient Structural Design & Construction (Rima Taher)**
This course discusses the topic of structural building design and construction for various hazards such as earthquakes, high winds/hurricanes, and floods. Each type of hazard is discussed separately. The structural design process is outlined based on the requirements of the latest codes and standards. Guidelines and recommendations for better design and construction in hazard areas are given. Design examples are used to illustrate the various design methods along with some practical building design projects. The standard procedures used in the safety assessment and evaluation of damaged buildings in the aftermath of hurricanes and earthquakes are introduced.

**Arch 541: Material Systems in Design (Tom Ogorzalek)**
The use of materials in contemporary architecture has provided new territories for creative and innovative design. This paradigm shift is largely due to advancements in technology, building science, and the tools available to designers for creative and technical production. There has been a predominant shift in architectural thinking through matter that has led to materials as a generative force in conceptualization and processes used in making contemporary architecture.

This seminar will allow students to examine material systems that give design agency to matter as a creative and technical force in the making of architecture. In doing so, it will provide students an opportunity to understand and explore the role material matters play in contemporary architectural theory and praxis. This course will provide a specific emphasis on sustainability with a focus on the application of material systems as a primary criteria for design

decisions. As a result, it will enable students to re-think the role of matter within their own design processes for future projects. Course requirements will be composed of individual position papers, group case study projects, and an individual final paper.

**ARCH 583 - 05 ST: Media Architectures: Immersive Design Tools (Andrzej Zarzycki)**
This course engages emerging digital media practices and technologies as the expanded field of architecture. It looks at photogrammetry, augmented reality (AR), and virtual reality (VR) as new frameworks for design thinking and virtual habitation/immersion. It discusses the role gamification plays in enabling in-depth interactions with/in the built environment. The course points to creative opportunities associated with these technologies and demonstrates effective pipelines for a wide range of design applications.

Students will research the use of these technologies across various disciplines with associated conceptual frameworks and will develop their own projects that integrate these technologies into design/media practices.

While grounding its discussion in virtually-built environments, the course provides opportunities for broad interdisciplinary topics and creative collaborations from media and interactivity to interiors and product design.

**ARCH 583 - 07 ST: Prefabricated Architectural Construction (Julio Garcia Figueroa)**
Critical to meeting a sustainable approach to building is the rethinking of our current methods of construction. This course proposes pre-fabrication as a critical part to the required revision to construction strategies, in order to address the climate change challenge. Prefabricated construction explores recent approaches in architectural design that use green building methodologies that deliver more efficient and precise buildings.

**ARCH 583 - 101 ST: High-performance facade design (Won Hee Ko)**
This project-based course aims to develop a fundamental and practical understanding of façade materials and assembly design and their relationship to building performance and indoor environmental quality. Students would develop a critical awareness of the performance issues related to façade materials, its geometry and dynamic control systems, and develop design strategies for enhancing energy and human impact. Lectures and assignments will teach students the core skills necessary to determine, integrate, and evaluate appropriate technologies based on facade performance simulations (e.g., ClimateStudio, Grasshopper-Ladybug, WINDOW, THERM, COMFEN) and synthesize the findings into their facade design. Prior experience with Rhinoceros 3D and Grasshopper is required.

**ARCH 583 - 103 ST: (Wood)n't You Like to Know (Erin Pelligrino & Charlie Firestone)**
As architects, our study and practice of the built environment exists mostly on paper. If we're lucky, those designs are then built, but by others. Your studies thus far have probably included very little creation of actual 'things', relegated likely to drawings and models and their digital twins.

Our course seeks to change that, returning the word 'architect' to its roots in 'architekton', meaning 'master builder'. Our work is predicated on the belief that making and thinking are inextricably linked, and therefore occurring simultaneously and harmoniously. In layman's terms, this course will be based on 'doing', on how drawing, thinking and designing coalesce into a built thing.

We will look deeply at wood and timber construction/details, and directly confront material, hardware, scale, operations, systems, skill and craft. In this course, students will explore design and fabrication as a physical endeavor. Our focus is shaped around making as a form of research and discovery – it will be our playground for ideas, concepts, problem finding and eventually, problem solving through invention and discovery. We will examine existing structural systems of interest, and re-design/re-mix/re-deploy those systems and their components at scale.

## History/Theory Electives

### ARCH 331 Formal Principles of Landscape Design Traditions Across the Globe (Tom Navin)

The space making principles in architecture can find their counterpart in landscape design and the parallel discipline of landscape architecture. This course tracks these principles through history and across the globe to understand how climate, geology and varied human cultural aspirations serve as the foundation to the formal principles of landscape design.

By way of lectures, readings and class discussions these issues will be considered, culminating in an independent student research investigation to be shared with the rest of the class.

### ARCH 574: Case Studies in Community and Urban Design (Cleve Harp)

This course will examine the state of cities and urban form here at the beginning of the 21st century. We will look at cities and their form-making and form- evolution along a timeline: Past / Present / Future. The progress of the course, however, will not be strictly linear. We will move instead back and forth among periods of time, cities under consideration, and urban issues under examination. We will take up facts and theories. We will look at cities and their evolution in the US and across the world. We will ask questions. We will research. We will document in both individual and team projects and work.

Just as cities are continuously morphing, changing, with time, without total control of their formation and their performance by the human species, so too will our investigations weave among scales, locations, players, and procedures. Expect the unexpected. Conclusions, however limited given the breadth of the subject matter, will emerge in two papers: a Midterm Paper and a Final Paper. The writing will be an opportunity for you to sift through and organize your own thoughts, beliefs, and commitments regarding the urban condition and how it might be improved.

**ARCH 583 - 03 ST: Sustainable Systems: From the Building to the Urban Scale (Esther Zipori)**

As the climate crisis worsens, the more active involvement of architects in defining and practicing sustainable development is becoming more urgent. This course aims to help students practice critical analysis skills through sustainability and learn to use these skills in design projects of various scales. We will use the United Nations Sustainable Development Goals (SDG) for 2030 to guide us through the various roles of sustainability in architecture. The course will explore: 1) what is sustainability; 2) how we thought about sustainability in architecture and urban planning in the past; and 3) more recent sustainability metrics of physical, social, and economic dimensions of buildings, urban spaces, cities, transportation systems, food networks, water, and other systems.

This seminar is designed for students to develop a deeper understanding of sustainability as something to be applied in the built environment, practiced in the design process, and lived in. We will do this through lectures, readings, class discussions, and site visits (Newark and NYC). In groups, students will develop a proposed Architectural addendum to the United Nations SDG as a way to consider a sustainable development framework for architects.

**ARCH 583 - 09: ST Design and Social Identity (Nidhip Mehta)**

This research and project-based seminar will explore what design can do to highlight and/or improve identity crises amongst human populations involving: gender, sexual orientation, religion, tribes/clans, ethnicity, race, class, disability, privilege, and marginalized/subjugated populations. Design has the power to change lives, transform environments, and manipulate behaviors. Design often has had negative impacts, but there is also a potential for doing much good. Design often tends to favor privileged populations, but it can also uplift the underprivileged. In this course, we will explore practical ways in which design can bring about positive social change - raise awareness, improve the quality of life, and benefit wider populations, many of whom are ignored, neglected, and forgotten.

Class sessions will be seminar discussions based on student-directed topics. In the first part of the semester, students will independently investigate research topics of their choosing. Following this, students will collaborate in teams to develop multidisciplinary pitch proposals for social-based design solutions. The course is open to all HCAD majors, and others with approval.

**ARCH 583 - 11 ST: History and Theory of Urbanism in the Middle East and North Africa (Mariam Abdelazim)**

Unlike western cities, cities in the Middle East and North Africa have different origins and history. From Medina to Baghdad to Aleppo, Cairo and finally Dubai, cities in the MENA region originated as Islamic capitals responding to religious needs. During the 19th century, colonization and westernization introduced modern city planning to Arab and Islamic cities. Consequently, a duality was created from the juxtaposition of the traditional city and the modern city. The oil economy in the Gulf cities proposed a different type of urbanism. This type was coined by Elsheshtawi as "Dubaization." Over the years, the planning and design of MENA

cities went through many iterations that echoed the cultural and social needs of the residents and the political agenda of the regime.

In this course, students will learn about the origins and evolution of the Islamic city and urbanism in the MENA region. They will also become familiar with the different types and designs of housing and public spaces. In addition, students will learn about urban issues in the MENA and environmental design. Students will be able to critically observe and analyze several examples of cities spaces in the Arab World and make connections and distinctions between their counterparts in Europe and the US. Historical and contemporary theories of urbanism in the MENA will be introduced to help students grasp the morphology and context of public spaces in this region.

**Architecture and Art + Design Electives**

**ARCH 583 - 01 ST: The Business of Architecture (Mark Bess)**
This seminar style course will engage students in an examination of the profession from an operational perspective.  We will, through invited guest talks, student research, case studies and in-person interviews examine the current state of architecture by looking at the history of how architects have worked, tracing changes in technology, client base, economics, and society to understand the existing and a possible future of the business of architecture.

We will explore how a rising crop of young architects are redefining practice; the opportunities available by exploiting the inherent skill sets that position architectural graduates as designers + technologist; the business impacts of a constantly changing and disrupted social, environmental & economic environment; the possibilities and potential methods of re-designing architectural education and the prospects of the business of architecture.

**ID 340 Materials and Processes (Martina Decker)**
Restriction: Junior level or higher. The student will be introduced to the basic materials and processes used in manufacturing of both short run and mass-produced objects. The course will comprise of lectures, field trips and design exercises employing both traditional and state-of-the-art manufacturing processes.

**INT 350 History of Furniture (Gretchen Von Koenig)**
Prerequisites: AD 161 and AD 162 or equivalent; or ARCH 251, ARCH 252 and ARCH 381. Survey course studying the history and characteristics of furniture design from antiquity to the present day. Study of social and design forces influencing furniture. Students will analyze furniture in terms of style, aesthetic intent, construction and materials, ergonomics, universal/barrier-free accessibility, sustainability, and technology. Major stylistic movements will be discussed.

**DD 334 Simulated Environments (Taro Narahara)**
Prerequisites: DD 263, DD 264. Prerequisite or corequisite: DD 275. Digital Design majors only, all others with permission of the department. This course will explore the application of desktop, non-immersive virtual reality to the representation of architecture. Course exercises and projects are designed to uncover both advantages and limitations of this emerging technology, on both practical and theoretical levels. The major focus of the course will be personal evaluation of these tools in the design of both object-specific and the spatial in architectural problem solving. The collaborative nature of the toolkit will inform design decisions vis-a-vis observation of participant behavior and open discussion with interactive critics.

**AD 490 ST: Art after the 80s (Ersin Altin)**
Today's art is rarely pretty. Much of art is difficult to look at and to understand; it is frequently confrontational. Contemporary art demands more than a simple visual communication or a passive affirmation/consumption. Art After the 80s aims to discuss how political agendas (especially after the Berlin Wall's collapse in 1989), a mono-polar economic world, deepening disparities, and increasing environmental problems changed the perception and production of art. Who consumes art today and how? More crucially, is art possible?

**AD 490 ST: Mapping Equity (Ana Penalba)**
This elective is the second in a series of "triple bottom line" sustainability and regenerative design electives along with "Drawing Ecology" and "Diagramming Economy". Mapping Equity explores techniques to visualize and understand and document the social aspects of the designed world especially as they relate to issues dealing with justice and well being.

**AD 490 ST: Lighting (Instructor TBD)**
Explores, through modeling and calculation, the means by which luminous environments are constructed. Perceptual responses such as visual comfort and delight are examined. Topics include daylighting footprints, model design and testing, and computer-assisted light level analysis. Areas of investigation include the relationship between daylight and electric light in spaces; the variations of light with time; role of task in lighting strategies; safety; means of control for light quantity and quality; and the design of various types of fixtures.

**Graduate Electives**

**ARCH 622 Life Cycle Assessment in Design (John Cays)**
Prerequisites: ARCH 500G and ARCH 555G or equivalent. This course tracks Life Cycle concepts as first applied to inanimate objects and systems by the U.S. military in the mid 20th Century through their development as an important part of the modern global environmental movement. It also provides opportunities for architecture and design students to integrate data driven design decisions through methodologies and tools that translate formal Life Cycle Assessment into their own design workflows.

**ARCH 626 Building Dynamics (Vera Parlac)**
In this class we are looking beyond sustainability and towards a goal of making buildings we build more productive and more aligned with dynamics of their surroundings and availability of resources. The emphasis on dynamics presents exciting opportunities for students to think how architecture as a discipline can expand its practice and integrate knowledge and technologies from diverse fields. Future architects and young professionals will be called upon to design spaces and places that must address climate change and resource depletion. In this course students find relevant arguments, useful references and cutting-edge projects that can introduce them to possible architectural futures and expand their own imagination.

The seminar will focus on theories behind kinetic, responsive, and adaptive architectural research. It will examine architecture in relation to the latest research in biology, material science, embedded systems, soft robotics, synthetic biology, bioengineering, and will address possible shifts in imagining and re-envisioning materialization of architecture. The course will underline architecture's inseparable link to technology and speculate on new possibilities for architecture as an integrated, responsive, adaptive, and productive participant within larger ecologies.

This seminar course has two components: it engages students (1) through lectures and discussions of assigned readings and (2) through development of a small- scale design research project that proposes a dynamic/kinetic material system.

**ARCH 636 Methods of Urban History (Georgeen Theodore)**
The course examines methods for conducting historically driven, interdisciplinary research on the built environment (with a focus on cities and suburbs) through the lens of architecture, landscape, geography, and material culture. Methodology is studied to inform the production of urban history and to frame historical perspectives on contemporary urban issues. Historiography and critical theory are key aspects of the study of urban history's methodologies. In addition to traditional historical methodologies, the course examines emerging digital humanities methodologies.

**ARCH 677 Geographic Information Systems (Cody Ellis)**
Geographical/Land Information System (GIS/LIS) is a computerized system capable of storing, manipulating and using spatial data describing location and significant properties of the earth's surface. GIS is an interdisciplinary technology used for studying and managing land uses, land resource assessment, environmental monitoring and hazard/toxic waste control, etc. Introduces this emerging technology and its applications.

**ARCH 662: ST Mapping Urbanism  (Kelly Hutzell)**
This seminar provides the critical tools necessary to examine the city as both a representation and a reality in flux. Through an interdisciplinary framework, students study urban history, theory, visual thinking and information design. Weekly lectures introduce global cities and their typologies. Readings, films, presentations, and class discussions focus on urban challenges and transformative design strategies. Parallel to these urban explorations, students learn to employ a diverse set of representational techniques to create inventive mappings.

**ARCH 654: Land Remediation and Community Revitalization (Colette Santasieri)**
This course introduces students to the process of transforming legacy industrial and vacant commercial properties into community assets. Viewing land remediation and redevelopment through the lens of the triple bottom line, the students will explore ways in which transformation of these properties can improve environmental conditions, catalyze economic development, and create more socially equitable and resilient communities. Students will interact with local government officials, real estate developers, environmental consultants, attorneys, and community planners. Course topics will include: environmental laws and regulations, real estate development, cleaning up contaminated properties, community engagement, environmental justice, gentrification, and transformative land uses.